Translation

PATENT COOPERATION TREATY

PCT/EP2003/011552

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2002P18185WO	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP2003/011552	International filing date (*day/month/year*) 17 October 2003 (17.10.2003)	Priority date (*day/month/year*) 15 November 2002 (15.11.2002)
International Patent Classification (IPC) or national classification and IPC G06T 15/20		
Applicant SIEMENS AKTIENGESELLSCHAFT		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
03 May 2004 (03.05.2004)	10 February 2005 (10.02.2005)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/EP2003/011552

I. Basis of the report

1. This report has been drawn on the basis of (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

☐ the international application as originally filed.

☒ the description, pages 1-12, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____.

☒ the claims, Nos. 1-12, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____.

☒ the drawings, sheets/fig 1/3-3/3, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-12	YES
	Claims		NO
Inventive step (IS)	Claims	1-12	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-12	YES
	Claims		NO

2. Citations and explanations

1. The present application relates to a method for 3D depiction of an object displayed in a volume data set.

The purpose of the invention is to enable improved depiction, allowing relatively large volume data sets to be depicted as a totality whilst still enabling fine structures to be easily identified.

This is achieved as per the invention in that all volume elements of a first volume data set are modulated or coded according to depth parallel to a main viewing direction which runs into the first volume data set.

Thereafter, the second volume data set is depicted by known methods (volume rendering).

Preferably, the modulation of the volume elements allows depth-dependent shadowing of the structures, which gives a plastic 3D impression.

This depth-dependent shadowing is achieved by the use of a bar-like transfer function. The transfer function defines over the entire depth of the volume data set in the main viewing direction and modulates the individual volume elements such that volume elements that are more distant from the viewing point are depicted more darkly.

2. Reference is made to the following document:

D1: EP-A-1 001 379 (MITSUBISHI ELECTRIC CORP) 17 May 2000 (2000-05-17)

3. D1 relates to 3D depiction in real time of a volume data set (see title and abstract). The volume data set contains, e.g., 3D images of the human body (cf. D1, paragraph [003]), as in the present application (cf. object 3 in figure 1).
According to D1 (paragraphs [0033] to [0037]), the opaqueness values, namely the alpha values, of the volume elements located between two parallel cut planes are modulated by the function shown in figure 7. The modulation depends on the position of the volume elements along the normal to these parallel cut planes (see D1, paragraph [036] and figure 7). The volume elements thus modulated are then depicted by means of a conventional algorithm (volume rendering - cf., e.g., the abstract).

4. The invention differs from the subject matter of D1 mainly in that, as per the invention, the entire first volume data set is modulated.
Unfortunately, this feature in claim 1 of the present application is characterised only by the vague expression "the volume elements" (claim 1, lines 6-7), which gives rise to an objection under PCT Article 6. So as to emphasise this essential and inventive feature clearly and unambiguously, this expression should be replaced by "all volume elements".
D1 discloses, in contrast, that only the volume elements associated with the volume section 150

(figure 7) are depicted (or not) (D1, paragraph [0033]). It could be argued that the distance between the two cut planes could be selected such that the two cut planes include the entire volume data set.

However, D1 gives no direct suggestion that the volume section 150 could include the entire volume data set. Rather, D1 appears to be restricted merely to the depiction of (relatively thin) sections (see paragraphs [0006], [0007], [0009], [0010]).

There are also further differences between the invention and the disclosure of D1 (e.g. the kind of modulation, cf. the transfer functions of the invention, figure 4, and D1, figure 7), even if they are not clearly shown in the claims.

5. Claim 1 can therefore be considered novel and inventive (PCT Article 33(2) and (3)).

Dependent claims 2 to 12 contain further embodiment features of the circuit as per claim 1. Since they are dependent on claim 1, they also meet the requirements of PCT Article 33(2) and (3) concerning novelty and inventive step.

The present invention as per claim 1 to 12 is clearly also industrially applicable (PCT Article 33(4)).